



ANTHRACNOSE DISEASES OF CLOVERS

In unusually wet seasons losses from anthracnose diseases may exceed 50 percent of the red or crimson clover crop in some Illinois fields. Seed production and also hay or silage yield and quality are greatly reduced in badly infected fields.

Two different kinds of anthracnose—northern and southern—occur in Illinois. Northern anthracnose, also called clover scorch, is caused by the fungus *Kabatella caulivora*. It is common in the northern half of Illinois. Southern anthracnose, caused by several closely related species of the fungus *Colletotrichum*, occurs mainly in southern Illinois.

Northern anthracnose develops best in dense stands during cool, damp weather in spring and early summer (optimum, 68° to 77°F or 20° to 25°C). Continuous hot, dry weather checks the disease. Southern anthracnose develops best in warm, wet weather (optimum, 82°F or 28°C).

Southern anthracnose attacks red clover, crimson clover, white sweetclover, burclover, and also the Flemish varieties of alfalfa. Alsike clover is essentially immune. The disease has not been observed on white (Dutch, Ladino) clover or yellow sweetclover. Northern anthracnose is restricted largely to clovers. Red, alsike, white sweet, and crimson clovers are attacked; alfalfa is immune. Red and crimson clovers are very susceptible.



Figure 1. Northern anthracnose of red clover.

SYMPTOMS AND DISEASE CYCLES

The two types of anthracnose produce similar leaf symptoms. From a distance, a field of severely infected plants appears scorched, as if by fire. The first symptoms to appear on the leaves, petioles, and stems are irregular, medium brown to black lesions, which may develop gray or light brown centers.

For further information contact Dean K. Malvick, Extension Specialist, Department of Crop Sciences, University of Illinois at Urbana-Champaign.

NORTHERN ANTHRACNOSE

Symptoms

Elongated, light to dark brown, sunken lesions form on the leaf petioles and stems and have a rather wide, dark brown or black margin. The lesions frequently split in the center. Petiole and stem lesions, which vary in length from 1/8 to over 3 inches, may girdle and kill the stems, causing the leaves to wilt and the leaves or flower heads to droop in a typical “shepherd’s crook” (Figure 1). Affected parts dry out rapidly and become so brittle that leaflets are easily broken off. New shoots develop prematurely to replace those lost through disease and these in turn become infected and destroyed. Seed production may be sharply reduced. Unlike southern anthracnose, northern anthracnose does not attack the crown and taproot. Affected plants are not killed. However, the disease does cause considerable loss of leaves, resulting in lowered forage quality.

Disease Cycle

The *Kabatiella* fungus produces white masses of conidiophores and conidia in small, irregular, colorless (hyaline) acervuli which lack setae. The acervuli are conspicuous in the deeper stem lesions and cracks. The clusters of blunt, cylindrical, hyaline conidiophores bear one or more hyaline, oblong, slightly curved, one-celled spores called conidia (Figure 2). A hand lens is needed to see the acervuli and masses of conidia.

The *Kabatiella* fungus overseasons as mycelium and acervuli in infected leaves, petioles, and stems. In the spring, wind and splashing rains carry the microscopic conidia from diseased plant debris to infect nearby plants and young seedlings. Contaminated harvesting equipment, insects, humans, and animals undoubtedly help distribute the conidia from plant to plant and from field to field. Diseased leaves break off easily when dry and are readily blown to neighboring fields, particularly during hay harvest. The fungus may be carried on or within the seed.

The conidia germinate to form hyphae, which penetrate the cuticle and grow for some distance between the cuticle and epidermis before passing in between the deeper cells. The mycelium is scanty until the host tissues are destroyed, after which coarse mycelial strands are formed. The coarse strands eventually give rise to broad, blunt conidiophores, which form parallel with the epidermis. The conidiophores then break through to the surface and produce conidia at their tips.

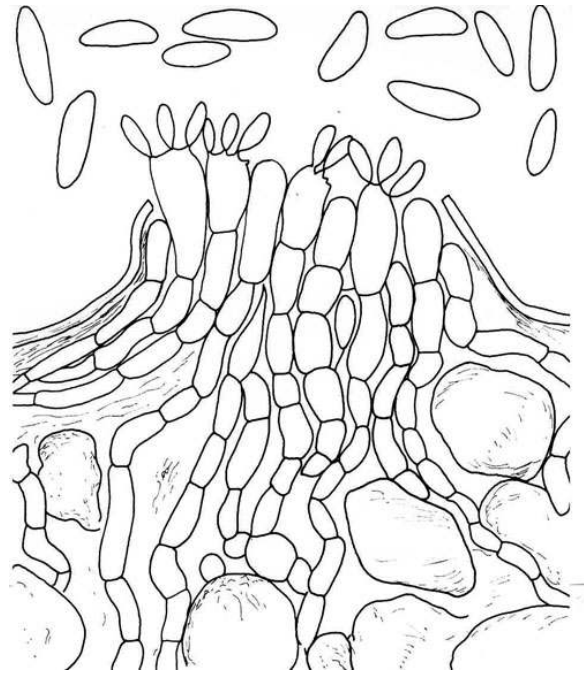


Figure 2. The northern anthracnose fungus, *Kabatiella caulivora*, as it would appear under a high-power light microscope (drawing by Lenore Gray).

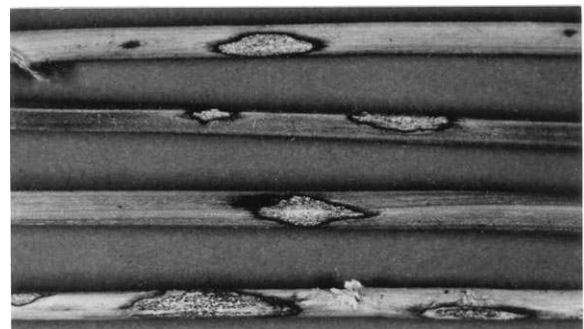


Figure 3. Southern anthracnose lesions on clover stems. Note the black fruiting bodies (acervuli) in the lesions (courtesy Dr. D.S. Wysong).

SOUTHERN ANTHRACNOSE

Symptoms

The *Colletotrichum* fungi form characteristic light to dark brown, elongated lesions on the petioles and stems (Figure 3). The lesions frequently rapidly girdle the stems causing a general dying and browning of the foliage. Characteristic of this disease is the appearance of small, black fruiting bodies (acervuli) which bristle with clusters of tiny, dark brown to black spines (setae), clearly visible with a hand lens in the center of mature, sunken lesions (Figure 3). The *Colletotrichum* fungi frequently attack the upper part of the taproot and crown resulting in a decay that can cause wilting and dying of entire plants. Infected crowns and stems may become so brittle that plants easily break off at ground level. Diseased crown tissue is usually brown to bluish black (Figure 4). Hot, dry, windy weather, after a period of general infection and disease development, can cause many leaves to suddenly wilt and die, since the damaged taproot and crown tissues are unable to supply enough water to the leaves. Southern anthracnose can reduce young clover stands during the summer months in a wet season. Some so-called “winter injury” to red clover is due to southern anthracnose infection on the taproot and crown. These infections weaken affected plants, making them more susceptible to other root-rotting organisms, adverse winter conditions, and long droughts.



Figure 4. Southern anthracnose of alfalfa; severely infected plant to the right. The internal symptoms on clovers are identical to those on alfalfa (courtesy Dr. A.S. Williams).

Disease Cycle

The *Colletotrichum* fungi, which include *C. destructivum*, *C. trifolii*, and *C. dematium* f. sp. *truncata*, overwinter as mycelium and acervuli on infected stems or in crowns and roots and on the surface of protected harvesting and other farm equipment. Rainsplash and wind carry the conidia from overwintering lesions to healthy plant parts. The fungus spreads rapidly during warm, moist weather. Rain and dew wash the conidia from the spore masses in the acervuli (Figure 5) onto the growing petioles and stems. The disease builds to its maximum severity in late summer and early fall. Spore masses form in the acervuli on stem lesions throughout the growing season and supply a ready source of conidia for secondary disease cycles. The fungi grow down infected stems into the crown and taproot causing killing of tissue and predisposition to winter injury; or plants may be killed.

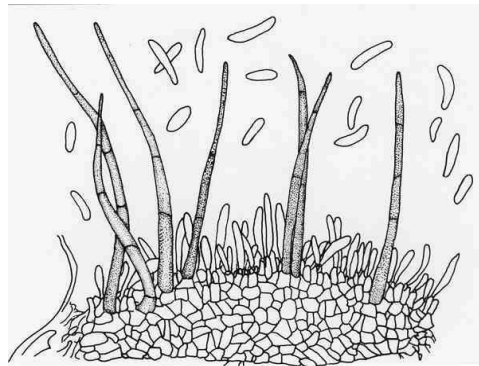


Figure 5. The southern anthracnose fungus, *Colletotrichum*, as it would appear under a high-power light microscope (drawing by Lenore Gray).

Control

1. Grow adapted, high-yielding resistant varieties. For the latest information on resistant varieties, recommended by University of Illinois Extension Agronomists and your nearest Extension office,

read Illinois Agricultural Pest Management Handbook. This publication should be available in your nearest Extension office or at ITCS, University of Illinois P345, 1917 S. Wright St., Champaign, IL 61820.

2. Plant at suggested rates and mow following a recommended schedule.
3. Thoroughly clean all harvesting equipment of debris before the first harvest in the spring and again during the growing season when going from an infected field to a healthy field.
4. Use clean, certified seed from disease-free fields.